Artificial Intelligence
NUID: 001738408
Name: Siyu Qiu
Assignment 2: A*, Hill climbing and Simulated Annealing.

All the source file is in pacman.controller.Siyu_Qiu.

A* Search Algorithm

Source code is in A_Controller, to running the alogorithm, just run `exec.runGameTimed(new A_Controller(),new StarterGhosts(),visual); in Executor.`

In A* search algorithm,I use a openlist to store the new nodes we met. From the beginning, pop out the node with maximum score from openlist, also put it on the closelist. Then we continue to discover more nodes from this node, if we found a node which exists in the openlist, (here, I treated two node are same based on their indexes) we need to check if the score from this path is bigger than the past, if it is, update the score and parent of this node in the openlist. If we found a new node, just need to add it into openlist and update its parent and score.

Hill Climbing algorithm

In hill climbing algorithm, we keep going forward and stop only when we found the score of its nearby nodes are all less or equal than current node or reach maxDepth, just return currentscore.

Simulated annealing algorithm

I setup an initial temperature, and let it decrease in each iterarion, when it becomes less than the minimum temperature. We stop and return current score. In this process, when we found the score of next node is bigger than current score, we keep going, otherwise if `Math.exp(score_diff/t)` is bigger than the number we randomly choose from [0,1), we keep going, else we stop and return current score. Based on the slides, I randomly choose the next move from allMoves.